SECTION 16719

PEDESTRIAN AND COUNTDOWN SIGNAL MODULE

PART 1 GENERAL

Furnish LED pedestrian countdown signal modules that conform to the following:

A. Manual on Uniform Traffic Control Devices (MUTCD)

B. Applicable provisions of the current specifications of the Institute of Transportation Engineers (ITE) standards titled Vehicle Traffic Control Signal Heads (VTCSH) and Pedestrian Traffic Control Signal Indications (PTCSI).

C. Federal Communications Commission (FCC) Title 47, Subpart B, Section 15 on the Emission of Electronic Noise.

1.01 MATERIALS

The items furnished and installed under this contract shall be new, unused of the latest product in production to commercial trade, and shall be of the highest quality as to materials used and workmanship. Manufacturer(s) furnishing these items shall be experienced in design and construction of such items and shall furnish evidence of having supplied similar items which have been in successful operation. The bidder shall be an established supplier of the items bid.

1.02 UNIT IDENTIFICATION

Units shall be clearly marked on the back surface of the unit in a permanent manner showing information required for warranty and long term performance. Information to be shown shall include manufacturer name, date of manufacture, electric power requirements, model type, and serial number

1.03 SILENCE OF SPECIFICATIONS

The apparent silence of these specifications as to any detail, or the apparent omission from them of a detailed description concerning any point, shall be regarded as meaning that only the best commercial practice is to prevail and that only material and workmanship of the finest quality are to be used. All interpretations of these specifications shall be made on the basis of this statement. The bidder shall be an established supplier of the items bid.

1.04 TEST EQUIPMENT

Supplier(s)/manufacturer(s) shall furnish with their bid a complete description and cost of any special test equipment that is necessary to install, operate, or maintain its equipment.

1.05 UNIT PRICES

A. Measurement
This item will be measured as by each countdown pedestrian signal module complete in place.

B. Payment
The work performed and materials furnished in accordance with this Item and measured as provided under "Measurement" will be paid at the unit price bid for "Countdown Pedestrian Signal Module". This price shall be full compensation for furnishing, assembling, and installing the countdown signal, and for all mounting attachments, labor, tools, equipment, and incidentals necessary to complete the work.

PART 2 PRODUCTS

Upon request, one schematic wiring diagram and installation manual shall be provided with each LED module.

2.01 MATERIALS

A. Countdown Pedestrian Signal Module

1. The message-bearing surface of the module shall be supplied with a fully populated "HAND" and "MAN" symbol, overlapping, that comply with PTCSI Standard for these symbols for a message-bearing surface of the size specified.

2. The LED module shall display a solid Portland orange hand and lunar white man and two Portland orange countdown numbers.

3. The numbers 00 to 99 on the numerical display shall have 2 rows of LEDs, that are side by side, not offset, and a minimum height of 9 inches.

4. The LED pedestrian and countdown signal module shall be a single, self-contained device.

5. Portland Orange (amber hand and countdown numbers) LEDs shall be "AlInGaP" (Aluminum Indium Gallium Phosphorus) technology or equal, and rated for 100,000 hours or more of continuous usage at 25°C and 20 mA. White LEDs shall be InGaN (Indium Gallium Nitide) technology.

6. The assembly and manufacturing process for all internal LED and electronic components shall be adequately supported to withstand mechanical shock and vibration from high winds and other sources.

7. The signal module shall be made of UL94VO flame-retardant materials. The lens is excluded from this requirement.

8. The lens of the LED pedestrian and countdown signal modules shall be polycarbonate UV stabilized.

9. The exterior of the lens of the LED pedestrian and countdown signal module shall be uniform and frosted to reduce sun phantom effect.

10. Each individual LED traffic module shall be identified for warranty purposes with the manufacturer's trade name, serial number and operating characteristics, i.e., rated voltage, power consumption, and volt-ampere.

11. LED pedestrian and countdown signal modules shall fit into traffic housings built to the VTCSH Standard without any modification to the housing.

12. Lens must diffuse the LED array over the entire surface of the lens.

B. ENVIRONMENTAL REQUIREMENTS

1. The LED pedestrian and countdown signal modules shall be rated for use in the ambient operating temperature range of -40°C to +60°C (-40°F to +140°F).

2. The LED pedestrian and countdown signal modules, when properly installed with gasket, shall be protected against dust and moisture intrusion per requirements of NEMA Standard 250-1991, sections 4.7.2.1 and 4.7.3.2, for type 4 enclosures to protect all internal LED, electronic, and electrical components.

C. ELECTRICAL REQUIREMENTS

1. The secured, color coded, 914 mm (36 in) long, 600V, 20 AWG minimum, jacketed wires, conforming to the National Electrical Code, rated for service at +105°C, are to be provided for electrical connection.

2. The LED pedestrian and countdown signal module shall operate from a 60 ±3 Hz AC line over a voltage range of 80 to 135 volts rms. Variations in the voltage range shall have a minimal impact, less than 10%, on the luminous output of the module. Rated voltage for all measurements shall be 120 ±3 volts rms.

3. The LED circuitry shall prevent perceptible flicker over the voltage range specified above.

4. Transient Voltage Immunity: The modules shall be tested for transient immunity, at minimum amplitude of 2000 volts, using the procedure described in Section 2.1.8, NEMA Standard TS 2-2003.

5. Catastrophic failure of one LED light source in Man & Hand Symbol shall not result in the loss of more than the light from the one display segment.

6. The LED pedestrian and countdown module shall be operationally compatible with the currently used controller assemblies. The LED pedestrian and countdown module shall be operationally compatible with conflict monitors.

7. The LED pedestrian and countdown module including its circuitry must meet Federal Communications Commission (FCC) Title 47, Subpart B, Section 15 regulations concerning the emission of electronic noise.

8. The LED pedestrian and countdown module shall provide a power factor of .90 or greater when operated at the nominal operating voltages, and 25 degrees C (77 degrees F).

9. Total harmonic distortion (current and voltage) induced into an AC power line by an LED pedestrian and countdown module operated at the nominal operating voltages, and 25 degrees C (77 degrees F), shall not exceed 20 percent.

D. INPUT PROTECTION (optional)

At the point of entry to the module for each input provide two 0.5-Ohm, 10-watt wire-wound power resistors with 0.2 micro Henries inductance (one on the AC+ Line & on the AC- Line). Provide one 20 Joule surge arrestor between AC+ to AC-. A 0.68 microfarad capacitor must be placed between AC+ & AC – (between the resistor & arrestor).

E. PHOTOMETRIC REQUIREMENTS

1. Luminance

For a minimum period of 60 months, the maintained minimum luminance values for the modules under the operating conditions defined in Sections 3.3.1 and 5.2.1, when measured normal to the plane of the icon surface, shall not be less than:

Walking person: 2,200 cd/m^2
Hand: 1,400 cd/m^2

The luminance of the emitting surface, measured at angles from the normal of the surface, may decrease linearly to a value of 50% of the values listed above at an angle of 15 degrees.

The light output requirements in this specification apply to pedestrian signal heads without any visors, hooded or louvered (egg-crate). Addition of such visors may affect the light output of the signal head, and the purchasing agency may wish to consult the issue with the manufacturer.

2. Uniformity and Distribution

The uniformity of the walking person and hand icons' luminance shall meet a ratio of not more than 1 to 5 between the minimum and maximum luminance values, as measured in 12mm (0.5 in) diameter spots.

When operating within the temperature range specified in Section B1, the average luminance of the module shall not exceed three times the maintained minimum luminance of the modules, as defined in Section D1.

3. Chromaticity

The standard colors for the LED Pedestrian Signal Module shall be White for the walking person and Portland Orange for the hand icon. The colors for these icons shall conform to the following color regions, based on the 1931 CIE chromaticity diagram:

Walking Person—
White: Blue boundary: x = 0.280.
1st Green boundary: 0.280 ≤ x < 0.400
y = 0.7917•x + 0.0983.
2nd Green boundary: 0.400 ≤ x < 0.450
y = 0.4600•x + 0.2310.
Yellow boundary: x = 0.450
1st Purple boundary: 0.450 ≤ x < 0.400
y = 0.4600•x + 0.1810.
2nd Purple boundary: 0.400 ≤ x < 0.280
y = 0.7917•x + 0.0483.

White Point	*x*	*y*
1	0.280	0.320
2	0.400	0.415
3	0.450	0.438
4	0.450	0.388
5	0.400	0.365
6	0.280	0.270

Hand—Portland Orange:
Yellow boundary: y = 0.390
White boundary: 0.600 ≤ x ≤ 0.659 y = 0.990 – x Red boundary:
y = 0.331.

Portland Orange Point	x	y
1	0.6095	0.390
2	0.600	0.390
3	0.659	0.331
4	0.669	0.331

4. Color Uniformity

The uniformity of the emitted colors shall be such that any color measurement within a 12mm (0.5 in) spot on the emitting surface shall fall within the following regions around the average measured color of the entire emitting surface:

• Walking Person—White:

where Δx and Δy are the differences in the chromaticity coordinates of the measured colors to the coordinates of the average color, using the CIE 1931 Chromaticity Diagram and a 2 degree Standard Observer.

• Hand—Portland Orange:

The dominant wavelength for all individual color measurements shall be within ±3 nm of the dominant wavelength for the average of all the individual color measurements.

F. FUNCTIONAL REQUIREMENTS

1. Basic Operation
   The control and regulation module shall allow for the countdown displays to be automatically adjusted with the programmed intervals of the traffic controller.

2. Operating Modes
   The module shall operate in one mode:
   i. Clearance Cycle Countdown Mode – The module will start counting when the flashing clearance signal turns on and will countdown to "0" and turn off when the steady "Don't Walk" signal turns on.

3. Power Failures
   The equipment must maintain a consistent countdown during short power failures (<1 second). A longer failure or an absence of signal superior to one (1) second must turn off display and trigger a restart system remembering the last sequence, as it is done for the NEMA traffic controller.

PART 3 EXECUTION

3.01 PRODUCT TEST AND INSPECTION

Upon final delivery The City of Houston shall randomly select two modules of each type and deliver City of Houston approved testing laboratory. Said modules shall be subjected to testing according to Part 2.C.4 with all associated costs including shipping to be born by supplier. Any quality issues resulting from these tests will result in rejection of whole shipment.

3.02 WARRANTY

A minimum guarantee for both materials and workmanship shall be provided by the Contractor for the products bid as specified. The guarantee (warranty) period shall begin the day the City officially accepts the item. Any guarantee work is to be completed within 15 days after receipt of notice of material deficiencies.

A. Warranties and Guarantees

1. All material, workmanship and labor furnished shall be covered by Supplier(s)/Manufacturer(s) guarantee and/or warranty for a minimum period of sixty (60) months. Warranty period shall begin the day the LED signal module is received by the City of Houston, either as new order or warranty repair. Bidder shall also be required to have resources to complete any required warranty work within fifteen (15) days after receipt of found defective LED signal module. The City of Houston's preference is for all non-warranty service to be charged a singular flat-rate. Successful bidder will include flat rate repair cost, if available in bid document for all non-warranty covered repairs. If flat rate repair charge is not available, then Supplier(s)/Manufacturer(s) will provide current hourly labor rate, along with any associated minimum charges that may apply.

2. Successful bidder shall bear all expenses connected with return of any material which the City deems necessary to return for adjustments during guarantee period. Any work done by the City will be at a rate of $40 per labor unit.

3. Modules which exhibit luminous intensities less than the minimum values specified within the first 36 months, of the date of delivery, shall be replaced or repaired.

4. The City of Houston may perform random sample testing on all shipments. Random sample testing will be completed within 45 days after delivery. Optical testing shall be performed with the LED module mounted in a standard pedestrian signal unit. The number of modules tested shall be determined by the quantity of each shipment. The Traffic Operations Division shall determine the sampling parameters to be used for the random testing. Acceptance or rejection of the shipment shall conform to ANSI/ASQC Z1.4 for random sampled shipments.

5. The City of Houston reserves the right to withhold payments which may be due, should it be discovered that material does not meet specifications and/or claims of bidder.

6. Supplier(s)/Manufacturer(s) shall make all engineering data, diagrams, software changes or improvements, which increases performance of equipment purchased under this bid, available to the City of Houston at no additional cost.

7. Supplier(s)/Manufacturer(s) shall have field engineers or technicians available on request to assure satisfactory initial operation, and to consult with City's Traffic Engineer, or his representative, on any special circuitry that may be required in certain applications.

END OF SPECIFICATION